G L O S S A R Y

A	Acceleration.
Å	Angstrom (0.0001 micrometer, 0.1 nm).
AAAS	American Association for the Advancement of Science.
AACS	Attitude and Articulation Control Subsystem onboard a spacecraft.
AAS	American Astronomical Society.
AC	Alternating current.
ALT	Altitude.
ALT	Altimetry data.
AM	Ante meridiem (Latin: before midday), morning.
am	Attometer (10^{-18} m).
AMMOS	Advanced Multimission Operations System.
AO	Announcement of Opportunity.
AOS	Acquisition Of Signal, used in DSN operations.
Aphelion	Apoapsis in solar orbit.
Apoapsis	The farthest point in an orbit from the body being orbited.
Apogee	Apoapsis in Earth orbit.
Apojove	Apoapsis in Jupiter orbit.
Apolune	Apoapsis in lunar orbit.
Apselene	Apoapsis in lunar orbit.
Argument	Angular distance.
Argument of periapsis	The argument (angular distance) of periapsis from the ascending node.
Ascending node	The point at which an orbit crosses the ecliptic plane going north.
Asteroids	Small bodies composed of rock and metal in orbit about the sun.
Attometer	10^{-18} meter.
AU	Astronomical Unit, mean Earth-to-sun distance, approximately 150,000,000 km.
AZ	Azimuth.
Barycenter	The common center of mass about which two or more bodies revolve.
BOT	Beginning Of Track, used in DSN operations.
BPS	Bits Per Second, same as Baud rate.
c	The speed of light, 300,000 km per second.

Caltech	California Institute of Technology.
Carrier	The main frequency of a radio signal generated by a transmitter prior to application of modulation .
C-band	A range of microwave radio frequencies in the neighborhood of 4 to 8 GHz.
CCD	Charge Coupled Device, a solid-state imaging detector.
C&DH	Command and Data Handling subsystem on board a spacecraft, similar to CDS.
CCS	Computer Command subsystem on board a spacecraft, similar to CDS.
CDS	Command and Data Subsystem onboard a spacecraft.
CDU	Command Detector Unit onboard a spacecraft.
Centimeter	10^{-2} meter.
Centrifugal force	The outward-tending apparent force of a body revolving around another body.
Centripetal	The inward acceleration of a body revolving around another body. **force**
CIT	California Institute of Technology, Caltech.
CMC	Complex Monitor and Control, a subsystem at DSCCs.
CNES	Centre National d'Études Spatiales, France.
Coherent	Two-way communications mode wherein the spacecraft generates its downlink frequency based upon the frequency of the uplink it receives.
Coma	The cloud of diffuse material surrounding the nucleus of a comet.
Comets	Small bodies composed of ice and rock in various orbits about the sun.
CRAF	Comet Rendezvous / Asteroid Flyby mission, cancelled.
CRT	Cathode ray tube video display device.
DC	Direct current.
DEC	Declination, the measure of a celestial body's apparent height above or below the celestial equator.
Descending node	The point at which an orbit crosses the ecliptic plane going south.
Downlink	Signal received from a spacecraft.
DSCC	Deep Space Communications Complex, one of three DSN tracking sites at Goldstone, California; Madrid, Spain; and Canberra, Australia; spaced about equally around the Earth for continuous tracking of deep-space vehicles.
DSN	Deep Space Network, JPL's worldwide spacecraft tracking facility.
DSS	Deep Space Station, the antenna front-end equipment at DSCCs.
Dyne	A unit of force equal to the force required to accelerate a 1g mass 1cm per second per second ($1cm/sec^2$). Compare with Newton.

E	East.
Earth	Third planet from the sun, a terrestrial planet.
Eccentricity	The distance between the foci of an ellipse divided by the major axis.
Ecliptic	The plane in which Earth orbits the sun.
EDR	Experiment Data Record.
EHz	ExaHertz (10^{18} Hz)
EL	Elevation.
Ellipse	A closed plane curve generated in such a way that the sums of its distances from the two fixed points (the foci) is constant.
ELV	Expendable launch vehicle.
EOT	End Of Track, used in DSN operations.
Equator	An imaginary circle around a body which is everywhere equidistant from the poles, defining the boundary between the northern and southern hemispheres.
ERT	Earth-received time, UTC of an event at DSN receive-time, equal to SCET plus OWLT.
ESA	European Space Agency.
ET	Ephemeris time, a measurement of time defined by orbital motions. Equates to Mean Solar Time corrected for irregularities in Earth's motions.
eV	Electron volt, a measure of the energy of subatomic particles.
F	Force.
FE	Far Encounter phase of mission operations.
FDS	Flight Data Subsystem.
Femtometer	10^{-15} meter.
FY	Fiscal year.
Fluorescence	The phenomenon of emitting light upon absorbing radiation of an invisible wavelength.
fm	Femtometer (10^{-15} m)
FM	Frequency modulation.
G	Giga (billion).
g	Gram, a thousandth of the metric standard unit of mass (see kg). The gram was originally based upon the weight of a cubic centimeter of water.
Gal	Unit of gravity field measurement corresponding to a gravitational acceleration of 1 cm/sec^2.

Galaxy	One of billions of systems, each composed of numerous stars, nebulae, and dust.
Galilean	The four large satellites of Jupiter so named because Galileo discovered them when he turned his telescope toward Jupiter: Io, Europa, Ganymede, and Callisto.
Gamma rays	Electromagnetic radiation in the neighborhood of 100 femtometers wavelength.
GCF	Ground Communications Facilities, provides data and voice communications between JPL and the three DSCCs.
GDS	Ground Data System, encompasses DSN, GCF, MCCC, and project data processing systems.
GEO	Geosynchronous Earth Orbit.
Geostationary	A geosynchronous orbit in which the spacecraft is constrained to a constant latitude.
Geosynchronous	A direct, circular, low inclination orbit about the Earth having a period of 23 hours 56 minutes 4 seconds.
GHz	Gigahertz (10^9 Hz).
GLL	Galileo spacecraft.
GMT	Greenwich Mean Time, similar to UTC but not updated with leap seconds.
Gravitation	The mutual attraction of all masses in the universe.
Gravitational waves	Einsteinian distortions of the space-time medium predicted by general relativity theory (not yet detected as of November 1995).
Gravity waves	Certain atmospheric waves within a planet's atmosphere.
Great circle	An imaginary circle on the surface of a sphere whose center is at the center of the sphere.
GSSR	Goldstone Solar System Radar, a technique which uses very high-power X and S-band transmitters at DSS 14 to illuminate solar system objects for imaging.
GTL	Geotail spacecraft.
GTO	Geostationary (or geosynchronous) Transfer Orbit.
HA	Hour Angle, the angular distance of a celestial object measured westward along the celestial equator from the zenith crossing. In effect, HA represents the RA for a particular location and time of day.
Heliopause	The boundary theorized to be roughly circular or teardrop-shaped, marking the edge of the sun's influence, perhaps 100 AU from the sun.
Heliosphere	The space within the boundary of the heliopause, containing the sun and solar system.
HGA	High-Gain Antenna onboard a spacecraft.
Horizon	The line marking the apparent junction of Earth and sky.

h	Hour.
Hz	Hertz, cycles per second.
ICE	International Cometary Explorer spacecraft.
Inclination	The angular distance of the orbital plane from the plane of the planet's equator, stated in degrees.
Inferior planet	Planet which orbits closer to the Sun than the Earth's orbit.
Inferior conjunction	Alignment of Earth, sun, and an inferior planet on the same side of the sun.
Ion	A charged particle consisting of an atom stripped of one or more of its electrons.
IPC	Information Processing Center, JPL's computing center on Woodbury Avenue in Pasadena.
IR	Infrared, meaning "below red" radiation. Electromagnetic radiation in the neighborhood of 100 micrometers wavelength.
IRAS	Infrared Astronomical Satellite.
ISOE	Integrated Sequence of Events.
Isotropic	Having uniform properties in all directions.
IUS	Inertial Upper Stage.
JGR	Journal Of Geophysical Research.
Jovian	Jupiter-like planets, the gas giants Jupiter, Saturn, Uranus, and Neptune.
JPL	Jet Propulsion Laboratory, operating division of the California Institute of Technology.
Jupiter	Fifth planet from the sun, a gas giant or Jovian planet.
k	Kilo (thousand).
K-band	A range of microwave radio frequencies in the neighborhood of 12 to 40 GHz.
kg	Kilogram, the metric standard unit of mass, based on the mass of a metal cylinder kept in France. See g (gram).
kHz	kilohertz.
Kilometer	10^3 meter.
km	Kilometers.
KSC	Kennedy Space Center, Cape Canaveral, Florida.
KWF	Keyword file of events listing DSN station activity.
LAN	Local area network for inter-computer communications.
Laser	Light Amplification by Stimulated Emission of Radiation.
Latitude	Circles in parallel planes to that of the equator defining north-south measurements, also called parallels.

L-band	A range of microwave radio frequencies in the neighborhood of 1 to 2 GHz.
Leap Year	Every fourth year, in which a 366th day is added since the Earth's revolution takes 365 days 5 hr 49 min.
LECP	Low-Energy Charged-Particular Detector onboard a spacecraft.
LEO	Low Equatorial Orbit.
LGA	Low-Gain Antenna onboard a spacecraft.
Light	Electromagnetic radiation in the neighborhood of 1 nanometer wavelength.
Light speed	299,792 km per second, the constant c.
Light time	The amount of time it takes light or radio signals to travel a certain distance at light speed.
Light year	The distance light travels in a year.
LMC	Link Monitor and Control subsystem at the SPCs.
Local time	Time adjusted for location around the Earth or other planets in time zones.
Longitude	Great circles that pass through both the north and south poles, also called meridians.
LOS	Loss Of Signal, used in DSN operations.
LOX	Liquid oxygen.
M	Mass.
M	Mega (million).
m	Meter (U.S. spelling; elsewhere, metre), the international standard of linear measurement.
Major axis	The maximum diameter of an ellipse.
Mars	Fourth planet from the sun, a terrestrial planet.
Maser	Microwave Amplification by Stimulated Emission of Radiation.
MC³	Mission Control and Computing Center.
MCCC	Mission Control and Computing Center.
MCT	Mission Control Team, Section 391 project operations.
Mean solar time	Time based on an average of the variations caused by Earth's non-circular orbit.
Mercury	First planet from the sun, a terrestrial planet.
Meridians	Great circles that pass through both the north and south poles, also called lines of longitude.
MESUR	The Mars Environmental Survey project at JPL, the engineering prototype of which is called MESUR Pathfinder.

Meteor A meteoroid which is in the process of entering Earth's atmosphere.

Meteorite Rocky or metallic material which has fallen to Earth or to another planet.

Meteoroid Small bodies in orbit about the sun which are candidates for falling to Earth or to another planet.

MGA Medium-Gain Antenna onboard a spacecraft.

MGN Magellan spacecraft.

MGSO Multimission Ground Systems Office at JPL (formerly called MOSO).

MHz Megahertz (10^6 Hz).

Micrometer μm (10^{-6} m).

Micron Obsolete term for micrometer, μm (10^{-6} m).

Milky Way The galaxy which includes the sun and Earth.

Millimeter 10^{-3} meter.

MIT Massachusetts Institute of Technology.

mm millimeter (10^{-3} m).

MO Mars Observer spacecraft.

Modulation The process of modifying a radio frequency by shifting its phase, frequency, or amplitude to carry information.

Moon A small natural body which orbits a larger one. A natural satellite.

MOSO Multimission Operations Systems Office at JPL; now called MGSO.

μm Micrometer (10^{-6} m).

N Newton, a unit of force equal to the force required to accelerate a 1kg mass 1m per second per second ($1m/sec^2$). Compare with dyne.

N North.

Nadir The direction from a spacecraft directly down toward the center of a planet. Opposite the zenith.

NASA National Aeronautics and Space Administration.

NE Near Encounter phase in flyby mission operations.

Neptune Eighth planet from the sun, a gas giant or Jovian planet.

NIMS Near-Infrared Mapping Spectrometer onboard the Galileo spacecraft.

nm Nanometer (10^{-9} m).

nm Nautical Mile, equal to the distance spanned by one minute of arc in latitude, 1.852 km.

Nodes Points where an orbit crosses a plane.

Non-coherent Communications mode wherein a spacecraft generates its downlink frequency independent of any uplink frequency.

Nucleus The central body of a comet.

OB	Observatory phase in flyby mission operations encounter period.
One-way	Communications mode consisting only of downlink received from a spacecraft.
Oort cloud	A large number of comets theorized to orbit the sun in the neighborhood of 50,000 AU.
OPCT	Operations Planning and Control Team, “OPSCON.”
OSR	Optical Solar Reflector, thermal control component onboard a spacecraft.
OSSA	Office Of Space Science and Applications, NASA.
OTM	Orbit Trim Maneuver, spacecraft propulsive maneuver.
OWLT	One-Way Light Time, elapsed time between Earth and spacecraft or solar system body.
PAM	Payload Assist Module upper stage.
Parallels	Circles in parallel planes to that of the equator defining north-south measurements, also called lines of latitude.
Pathfinder	The Mars Environmental Survey (MESUR) engineering prototype.
PDS	Planetary Data System.
PDT	Pacific Daylight Time.
PE	Post Encounter phase in flyby mission operations.
Periapsis	The point in an orbit closest to the body being orbited.
Perigee	Periapsis in Earth orbit.
Perihelion	Periapsis in solar orbit.
Perijove	Periapsis in Jupiter orbit.
Perilune	Periapsis in lunar orbit.
Periselene	Periapsis in lunar orbit.
Phase	The angular distance between peaks or troughs of two waveforms of similar frequency.
Phase	The particular appearance of a body’s state of illumination, such as the full phase of the moon .
Photovoltaic	Materials that convert light into electric current.
PHz	Petahertz (10^{15} Hz).
PI	Principal Investigator, scientist in charge of an experiment.
PIO	JPL’s Public Information Office.
Plasma	Electrically conductive fourth state of matter from solid, liquid, and gas, consisting of ions and electrons.
PLL	Phase-lock-loop circuitry in telecommunications technology.
Pluto	Ninth planet from the sun, sometimes classified as a small terrestrial planet.

pm	Picometer (10^{-12} m).
PM	Post meridiem (Latin: after midday), afternoon.
PN10	Pioneer 10 spacecraft.
PN11	Pioneer 11 spacecraft.
PST	Pacific Standard Time.
PSU	Pyrotechnic Switching Unit onboard a spacecraft.
RA	Right Ascension, the angular distance of a celestial object measured in hours, minutes, and seconds along the celestial equator eastward from the vernal equinox.
Radian	Unit of angular measurement equal to the angle at the center of a circle subtended by an arc equal in length to the radius. Equals about 57.296 degrees.
RAM	Random Access Memory.
Red dwarf	A small star, on the order of 100 times the mass of Jupiter.
Refraction	The deflection or bending of electromagnetic waves when they pass from one kind of transparent medium into another.
RF	Radio Frequency.
RFI	Radio Frequency Interference.
ROM	Read Only Memory.
RPIF	Regional Planetary Imaging Data Facilities.
RTG	Radioisotope Thermo-Electric Generator onboard a spacecraft.
RTLT	Round-Trip Light Time, elapsed time roughly equal to 2 x OWLT.
S	South.
SA	Solar Array, photovoltaic panels onboard a spacecraft.
SAF	Spacecraft Assembly Facility, JPL Building 179.
SAR	Synthetic Aperture Radar.
Satellite	A small body which orbits a larger one. A natural or an artificial moon. Earth-orbiting spacecraft are called satellites. While deep-space vehicles are technically satellites of the sun or of another planet, or of the galactic center, they are generally called spacecraft instead of satellites.
Saturn	Sixth planet from the sun, a gas giant or Jovian planet.
S-band	A range of microwave radio frequencies in the neighborhood of 2 to 4 GHz.
SC	Steering Committee.
SCET	Spacecraft Event Time, equal to ERT minus OWLT.
SCLK	Spacecraft Clock Time, a counter onboard a spacecraft.
Sec	Second.
SEDR	Supplementary Experiment Data Record.

SEF	Spacecraft event file.
SEGS	Sequence of Events Generation Subsystem.
Semi-major axis	Half the distance of an ellipse's maximum diameter, the distance from the center of the ellipse to one end.
Shepherd moons	Moons which gravitationally confine ring particles.
Sidereal time	Time relative to the stars other than the sun.
SIRTF	Space Infrared Telescope Facility.
SOE	Sequence of Events.
SNR	Signal-to-Noise Ratio.
SP-100	JPL's Space Power-100 Project developing nuclear reactors for use in space.
SPC	Signal Processing Center at each DSCC.
SSA	Solid State Amplifier in a spacecraft telecommunications subsystem, the final stage of amplification for downlink.
SSI	Solid State Imaging Subsystem, the CCD-based cameras on Galileo.
SSI	Space Services, Inc., Houston, manufacturers of the Conestoga launch vehicle.
STS	Space Transportation System (Space Shuttle).
Subcarrier	Modulation applied to a carrier which is itself modulated with information-carrying variations.
Superior planet	Planet which orbits farther from the sun than Earth's orbit.
Superior conjunction	Alignment between Earth and a planet on the far side of the sun.
SWG	Science Working Group.
TAU	Thousand AU Mission.
TCM Trajectory	Correction Maneuver, spacecraft propulsive maneuver.
TDM	Time-division multiplexing.
Three-way	Coherent communications mode wherein a DSS receives a downlink whose frequency is based upon the frequency of an uplink provided by another DSS.
THz	Terahertz (10^{12} Hz).
TOS	Transfer Orbit Stage, upper stage.
Transducer	Device for changing one kind of energy into another, typically from heat, position, or pressure into a varying electrical voltage or vice versa, such as a microphone or speaker.
Transponder	Electronic device which combines a transmitter and a receiver.
TRC	NASA's Teacher Resource Centers.

TRM Transmission Time, UTC Earth time of uplink.

True anomaly The angular distance of a point in an orbit past the point of periapsis, measured in degrees.

TWNC Two-Way Non-Coherent mode, in which a spacecraft's downlink is not based upon a received uplink from DSN.

Two-way Communications mode consisting of downlink received from a spacecraft while uplink is being received at the spacecraft. (See also "coherent.")

TWT Traveling Wave Tube, downlink power amplifier in a spacecraft telecommunications subsystem, the final stage of amplification for downlink (same unit as TWTA).

TWTA Traveling Wave Tube Amplifier, downlink power amplifier in a spacecraft telecommunications subsystem, the final stage of amplification for downlink (same unit as TWT).

ULS Ulysses spacecraft.

μm Micrometer (10^{-6} m).

Uplink Signal sent to a spacecraft.

Uranus Seventh planet from the sun, a gas giant or Jovian planet.

USO Ultra Stable Oscillator, in a spacecraft telecommunications subsystem.

UTC Universal Time, Coordinated.

UV Ultraviolet (meaning "above violet") radiation. Electromagnetic radiation in the neighborhood of 100 nanometers wavelength.

Venus Second planet from the sun, a terrestrial planet.

VGR1 Voyager 1 spacecraft.

VGR2 Voyager 2 spacecraft.

VLBI Very Long Baseline Interferometry.

W Watt, a measure of electrical power equal to potential in volts times current in amps.

W West.

Wavelength The distance that a wave from a single oscillation of electromagnetic radiation will propagate during the time required for one oscillation .

WWW World-wide Web.

X-band A range of microwave radio frequencies in the neighborhood of 8 to 12 GHz.

X-ray Electromagnetic radiation in the neighborhood of 100 picometers wavelength.

Z Zulu in phonetic alphabet, stands for GMT.

Zenith The point on the celestial sphere directly above the observer. Opposite the nadir.

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